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# PATENT ABSTRACTS OF JAPAN

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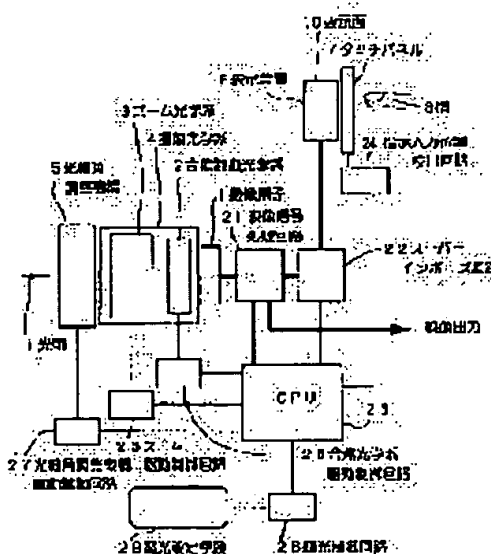
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## (54) IMAGE PICKUP DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To make an operation command of a video camera quickly and surely.

SOLUTION: The device is provided with an image pickup element 1, a display device 6 displaying an image picked up by the image pickup element 1, a superimpose circuit 22 displaying the operation item of the video camera superimposed onto the image picked up by the image pickup element 1 on the display device 6, a touch panel 7 pointing out an object position of an image displayed on the display device 6, and a discrimination circuit consisting of a CPU 23 discriminating the significance of the position commanded by the touch panel 7. Then the position pointed out by the touch panel 7 is displayed on the image picked up by the image pickup element 1 via the superimpose circuit 22 and the operation of the video camera is conducted based on the operation command.



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## CLAIMS

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[Claim(s)]

[Claim 1] Image pick-up equipment which is equipped with the following and characterized by being further operated according to the directions inputted by the aforementioned directions input means. The image pick-up means which consists of an image pick-up element and image pick-up optical system at least. A display means to display the picture photoed by the  
15 aforementioned image pick-up means. A means to display the operation item of image pick-up equipment on the aforementioned display means in piles at the picture photoed by the aforementioned image pick-up means. A directions input means direct the position which makes into the purpose of the picture displayed on the aforementioned display means, a distinction  
20 means distinguish the meaning which the position directed by the aforementioned directions input means has, and a means display in piles the position directed by the aforementioned directions input means to the picture photoed by the aforementioned image pick-up means.

[Claim 2] The aforementioned directions input means is image pick-up equipment according to claim 1 which consists of light-transmission members and is characterized by being arranged in  
25 the screen of the aforementioned display means in piles.

[Claim 3] Image pick-up equipment according to claim 1 characterized by providing the image scale-factor adjustable control means which carry out the enlarged display of the picture range by which specification was carried out [ aforementioned ] to the screen of the aforementioned display means in arbitrary sizes while providing a means to specify the arbitrary picture fields of  
30 the picture displayed on the aforementioned display means.

[Claim 4] The aforementioned image scale-factor adjustable control means are image pick-up equipment according to claim 1 characterized by constituting optically.

[Claim 5] Image pick-up equipment according to claim 1 which detects the marginal periphery of the picture in the picture field by which specification was carried out [ aforementioned ], and is  
35 characterized by providing a means to perform autofocus control based on this while providing a means to specify the arbitrary picture fields of the picture displayed on the aforementioned display means.

[Claim 6] Image pick-up equipment according to claim 1 which detects the brightness of the picture in the picture field by which specification was carried out [ aforementioned ], and is  
40 characterized by providing the exposure mechanism which makes the optimal the brightness of the picture field specified based on this while providing a means to specify the arbitrary picture fields of the picture displayed on the aforementioned display means.

[Claim 7] The aforementioned directions input means arranged on the screen of the aforementioned display means and the aforementioned display means is image pick-up  
45 equipment according to claim 1 carry out \*\*\*\*\* provided the means of communication transmit

the information between the aforementioned display means and the aforementioned directions input means, and the aforementioned image pick-up means while carrying out to separable composition as the feature in the aforementioned image pick-up means.

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## TECHNICAL FIELD

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[The technical field to which invention belongs] this invention relates to the image pick-up equipment performed by the input means which prepared the operator guidance of image pick-up equipment on display in more detail about image pick-up equipment.

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## PRIOR ART

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[Description of the Prior Art] Recently, the so-called autocratic operation coverage prospers in the on-the-spot coverage in a television report. In connection with this, the demand of the video camera in which operation that operation is simply easy, still quicker, and positive is possible is growing with the video camera which suits autocratic operation, i.e., much more much more high definition and multi-functionalization.

[0003] In functional operation of a video camera, there is an input to specification for [ for specification of the candidate photographic subject for auto-focusing and an auto iris, specification of the object range, and a photographic subject automatic follow up ] tailing, a zoom block definition, or various functional operation menus etc. These were functions with desirable directing directly, looking at an image pick-up screen, and in operation by the switch group of the conventional lens-barrel type view finder and the camera case side, pinpointing of the arbitrary positions on a screen and arbitrary picture fields was complicated, and was not easy.

[0004] For this reason, although there were some which enabled the directions input on the view finder screen using the visual-axis input unit of a lens-barrel type view finder, it was what cannot make operation quick but connotes a practical problem that this has coarse resolution and a visual axis cannot be shifted before switching of operation determination etc.

[0005] Moreover, since the active frame control method inputted by the joy pad also served as indirect alter operation, supervising a lens-barrel type view finder, operation was unstable and it was difficult to reflect a delicate intention of a coverage person quickly and exactly.

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## EFFECT OF THE INVENTION

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[Effect of the Invention] Since the input of various functional operations can carry out on the screen according to the image pick-up equipment of this invention, supervising a photography picture, as compared with the image pick-up equipment which has an operation input switch separately, certain and quick image pick-up equipment can be operated, without caring about the position of a switch.

[0033] Moreover, image pick-up equipment can be operated, always checking operating state, since a working state is displayed by a zoom frame, cursor, etc. with a photography screen on a screen now.

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[0034] Furthermore, the operator guidance input section can be separated from image pick-up equipment, and the flexibility of operation improves.

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## 5 TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] Therefore, the technical problem of this invention tends to enable it to operate operation of a video camera quickly and exactly reflecting an intention of a coverage person based on the screen, opening a coverage person wide from operation of the video camera in the posture which looks into a lens-barrel type view finder, and looking at a still more large-sized image pick-up screen.

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## MEANS

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[Means for Solving the Problem] this invention is made in view of the above-mentioned technical problem. image pick-up equipment The image pick-up means which consists of an image pick-up element and image pick-up optical system at least, and a display means to display the picture photoed by the image pick-up means, A means to display the operation item of image pick-up equipment on a display means in piles at the picture photoed by the image pick-up means, A directions input means to direct the position made into the purpose of the picture displayed on the display means, A distinction means distinguish the meaning which the position directed by the directions input means has, and a means display in piles the position directed by the directions input means on the picture photoed by the image pick-up means are provided, and it carries out to the composition further operated according to the directions inputted by the directions input means.

[0008] The directions input means consists of light-transmission members, and is made the composition currently arranged in the screen of the aforementioned display means in piles.

[0009] While providing a means to specify the arbitrary picture fields of the picture displayed on the display means, it is made the composition possessing the image scale-factor adjustable control means which carry out the enlarged display of the specified picture range to the screen of a display means in arbitrary sizes. Moreover, even if there are few aforementioned image scale-factor adjustable control means, one is constituted optically.

[0010] While providing a means to specify the arbitrary picture fields of the picture displayed on the display means, the marginal periphery of the picture in the specified picture field is detected, and it is made the composition possessing a means to perform autofocus control based on this.

[0011] While providing a means to specify the arbitrary picture fields of the picture displayed on the display means, the brightness of the picture in the specified picture field is detected, and it is made the composition possessing the exposure mechanism which makes the optimal the brightness of the picture field specified based on this.

[0012] With an image pick-up means, the directions input means arranged on the screen of a display means and a display means is made the composition possessing the means of communication which transmits the information between a display means and a directions input means, and an image pick-up means, and solves the above-mentioned technical problem while making it separable composition.

[0013] Therefore, with the composition mentioned above, a video camera can be operated quickly and exactly by arranging a transparent directions input means in the screen of a display means based on the picture currently displayed on the display means, supervising a large-scale photography picture.

5 [0014]

[Embodiments of the Invention] The example of a form of operation of this invention is explained with reference to drawing 1 or drawing 6. Drawing 1 is the block diagram showing the composition of the image pick-up equipment by this invention, and drawing 2 is drawing showing operation of the image pick-up equipment by this invention. Drawing 3 is drawing showing the frame zoom which is an example of a directions input, and drawing 4 is drawing showing the frame zoom input stream shown in drawing 3. It is drawing in which drawing 6 shows an example of a focus control for an example of an optical-axial-angle adjustment mechanism which uses drawing 5 for this invention again.

10 [0015] First, with reference to drawing 1, the composition of the image pick-up equipment by this invention is explained. The photography optical system 4 which comes to contain the image pick-up element 1 which consists of CCD etc., and the focus control optical system 2 and the zoom optical system 3, and the optical-axial-angle adjustment mechanism 5 prepared in the front part of the zoom optical system 3 are provided, and optical system is constituted. Moreover, the operation input section of image pick-up equipment is formed by the display 6 which displays the image from the image pick-up element 1, and the touch panel 7 with the light-transmission nature prepared on the screen 10 of display 6, and operation of image pick-up equipment is inputted by contact by finger 8 grade.

15 [0016] Below, it explains the circuit block of a video signal and a control signal, and that a signal flows. The video signal from the image pick-up element 1 is inputted into the superimposition circuit 22, the operation item of image pick-up equipment is added to an image, and is sent to display 6, and is displayed on the screen 10 while signal processing is carried out by the video-signal processing circuit 21 and sent out to the equipment of the image pick-up equipment shell exterior as an image output. Although mentioned later in detail, a finger 8 describes the position of the touch panel 7 according to the displayed directions, the position which touched is detected by the directions input position detector 24, and the inputted meaning is judged by CPU23.

20 [0017] Moreover, the axial-angle adjustment mechanism 5 is controlled [ the focus control optical system 2 ] for the zoom optical system 3 by directions of CPU23 through the optical-axial-angle adjustment mechanism drive control circuit 27 through the zoom drive control circuit 26 through the focus optical-system drive control circuit 25. Furthermore, the exposure setting means 29 is controlled for the exposure conditions determined by CPU23 through the exposure control circuit 28. In addition, although the exposure setting means 29 has not carried out illustration, the electronic shutter which determines shutter speed, the iris which opts for drawing are included.

25 [0018] The composition and its operation of the operator guidance input section constituted from display 6 which is the important section of this invention, and a touch panel 7 next are explained in detail with reference to drawing 2 or drawing 4.

30 [0019] Display 6 is equipment which consists of the Braun tube, liquid crystal, a plasma display, etc., this is covered to the screen 10 and the touch panel 7 is formed in it. The operation item of image pick-up equipment is displayed on the screen 10, and the target operation can be inputted by touching the operation item to which this operation item and the position of a touch panel 7 correspond and correspond from a touch panel 7.

[0020] For example, there are Menu A, a menu B, and a menu C as a kind menu 11 very much, and the minor-key menu 12 is prepared very much corresponding to the menu A of the kind menu 11, Menu B, and Menu C. Although the item of the minor-key menu 12 has AF lock, Frame AF, AE lock, Frame AE, W/B, Zoom T, Zoom W, and frame zoom here when Menu A is chosen very much as a kind menu 11, though natural, it does not restrict to these items. Moreover, in order to perform selection, the execution switch 13 is formed independently in the menu. Furthermore, it is P1-P2 although mentioned later in detail. The frame 14 which defines the range of the photography picture specified as a vertical angle, i.e., a zoom frame, is displayed. The overlap display of the item mentioned above is carried out through the superimposition circuit 22 mentioned above in the photography picture.

[0021] Here, the operating procedure of the frame zoom of image pick-up equipment is described as an example. First, the Oita menu shown in the sign 50 of drawing 4 is displayed. Menu A, Menu B, and Menu C are displayed by this operation. Although a kind menu is chosen very much with a sign 51 next, supposing frame zoom operation is in Menu A, for example, the position of Menu A will be touched from a touch panel 7. CPU23 judges the touched contents of a position, and while displaying the mark that Menu A inputted, AF lock which is the minor-key menu 12, Frame AF, AE lock, Frame AE, W/B, Zoom T, Zoom W, and frame zoom are displayed (sign 52).

[0022] The mark that the minor-key menu selection of a sign 53 described the display position of frame zoom from the touch panel 7 similarly, CPU23 next judged, and frame zoom inputted is displayed. Next, specification of the zoom frame in a sign 54 is the position which touched the touch panel 7 first P1 It is the position which carried out and touched below P2 It carries out and is P1-P2. The range of the rectangle made into the vertical angle is determined as a zoom field.

[0023] After all setups become settled, Execution SW is too inputted from a touch panel 7, and operation of frame zoom is started (sign 55). In order to expand and display a zoom field on the screen 10 whole, in CPU23, the decision of the optimal exposure conditions of the picture in the operation of a zoom scale factor, calculation of a main pixel, adjustment of a photography optical axis, the auto-focusing to the picture in a zoom field, and a zoom field etc. is made, and image pick-up equipment is operated. P1-P2 shown in drawing 3 (a) by operation mentioned above As the field of the rectangle made into the vertical angle shows in this drawing (b), it will be expanded and displayed on the screen 10 whole, and frame zoom will be performed. Also in other operations, it can carry out exactly and quickly like the procedure mentioned above and abbreviation, supervising a photography picture.

[0024] Moreover, by putting on the place distant from the main part of photography equipment, and connecting communication between the operator guidance section and the main part of photography equipment by the cable or radio, the remote control composition of photography equipment can form easily the operator guidance input section which consists of display 6 and a touch panel 7, and it can obtain the flexibility on operation.

[0025] Below, an example of an optical-axial-angle adjustment mechanism used for the image pick-up equipment of this invention with reference to drawing 5 is explained. It is an optical axis L1 about the prism 15 from which a vertical angle changes in front of the image pick-up optical system 4 as shown in this drawing. It receives, and it is arranged so that the one field may become perpendicular. The vertical angle of prism 15 is changed here according to the control information of optical-axis amendment, the incident-light shaft to an image pick-up element is changed, further, another prism is arranged so that it may intersect perpendicularly with prism 15, and it is an optical axis L1. The angle of two shaft orientations with which it intersects

perpendicularly within a perpendicular field is adjusted.

[0026] When the vertical angle of prism 15 is set to  $\alpha$  and the deflection angle of outgoing radiation is set to  $\delta$ , an adjustment angle sets the refractive index of prism 15 to  $n$ , and is  $\sin\theta = \sin(\alpha + \delta) = n\sin\alpha$ . (1)

5 Since it is small,  $\theta$  is  $\theta = \alpha + \delta = n\alpha$ . (2)

A next door, therefore  $\delta = (n-1)\alpha$  (3)

It becomes. It is referred to as  $n=1.5$  here, and when the variation rate of the  $\alpha$  is carried out twice [ \*\* ],  $\delta$  will change \*\*1 deflection angle.

[0027] Besides the optical optical-axial-angle adjustment mechanism in which it explained  
10 above, it is an optical axis L1. To two shaft orientations with which it receives and intersects perpendicularly in a perpendicular flat surface The mechanical adjustment mechanism in which have the rotation shaft which rotates independently, respectively, make it rotate according to the adjustment information on an optical axial angle, and an optical axial angle is adjusted, Or there is an electric-type adjustment mechanism adjusted by logging of the photography picture of an  
15 image pick-up element, and it is independent, or these adjustment mechanism may be combined, and, naturally you may use.

[0028] Below, an example of the focus control used for this invention with reference to the block diagram of drawing 6 is explained. Composition is constituted including the motor 32 which moves the lens which constitutes the image pick-up optical system 4, and the image pick-up  
20 element 1 which consists of CCD etc. and the image pick-up optical system 4 in the direction of an optical axis, as shown in this drawing. Signal processing of the picture signal from the image pick-up element 1 is carried out in the video-signal processing circuit 21, and the luminance signal Y separated from the video signal computes the signal which serves as autofocus criteria in the evaluation calculation circuit 30, it is CPU23 and generates an autofocus control signal  
25 based on this signal. The aforementioned control signal is impressed to a motor 32 through the focus optical-system drive control circuit 25 from the above CPU 23, moves the position of the lens which constitutes the image pick-up optical system 4, and doubles it with a focus position.  
[0029] CPU 23 is offered in order control autofocus operation at large, it works on the frame signal generating circuit 31 which determines the evaluation calculation frame in the evaluation  
30 calculation circuit 30, generate a frame signal, memorize the relation between an evaluation value, the position of the lens which constitutes the image pick-up optical system 4, and a focal position, to judge a focal state from an evaluation value change, input a control signal to the focus optical-system drive control circuit 25 and to control operation of a motor 32.

[0030] In addition, the frame signal generated in the aforementioned frame signal generating  
35 circuit 31 may be replaced, and the signal of the zoom frame 14 mentioned above may be used. Moreover, naturally you may use other mechanisms which carry out the same work, without being concerned with the autofocus mechanism mentioned above.

[0031] Furthermore, as exposure conditions were determined and mentioned above in CPU23 based on the brightness information of a photography picture, or the information on an exposure  
40 sensor established separately about automatic exposure, it carries out by controlling the exposure setting meanses 29, such as an electronic shutter and an iris, through the exposure control circuit 28.

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## 45 DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the busy condition of a video camera.

[Drawing 2] It is drawing showing positioning of the lens section by this invention, and a grip.

[Drawing 3] It is drawing showing the gestalt of operation of the first of this invention.

5 [Drawing 4] It is drawing showing the gestalt of operation of the second of this invention.

[Drawing 5] It is drawing showing the gestalt of operation of the third of this invention.

[Drawing 6] It is drawing for explaining the justification range of the lens section and a grip.

[Description of Notations]

1 Video Camera

10 2 Main Part of Camera

3 Lens Section

4 Mounting Section

5 Grip

6 Shoulder Pad

15 7 Cameraman

8 Right Arm

9 Joint Section

10 Gear for Auto Irises

11 Gear for Auto Zoom

20 12 Gear for Remote Focuses

13 Drive Block

14 Control Unit

15 Geared Motor

16 Gear

25 17 Interconnection Cable

20, 20a, 20b, 20c Screwhole

21, 21a, 21b, 21c Screwhole

22 23 Long hole

24 25 Hole

30 30 Zoom Operation Button

31 Auto Iris ON/OFF Switch

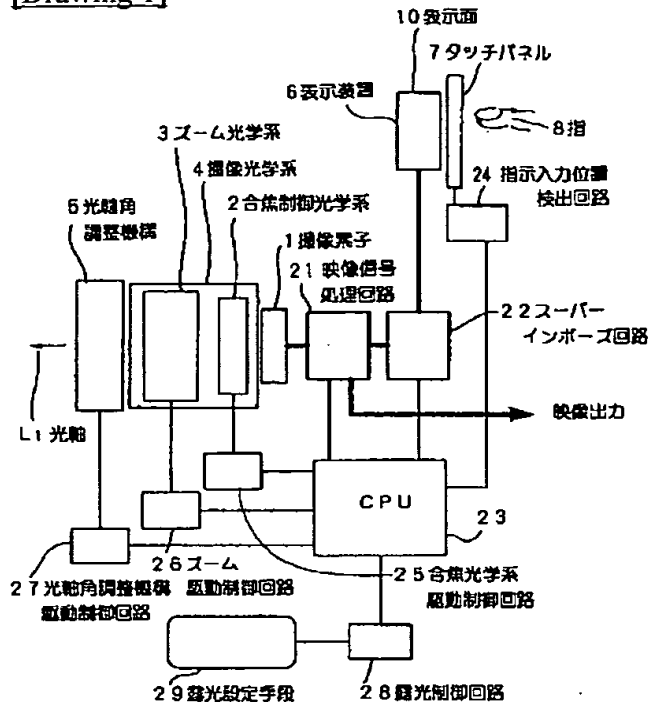
32 REC Start ON/OFF Switch

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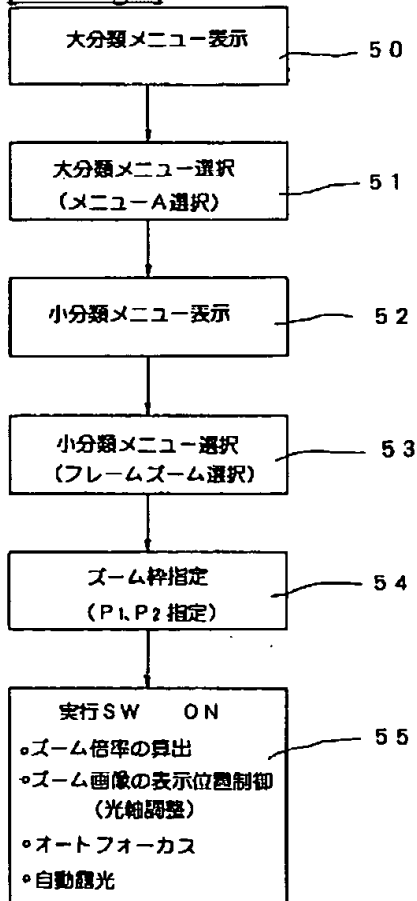
35 DRAWINGS

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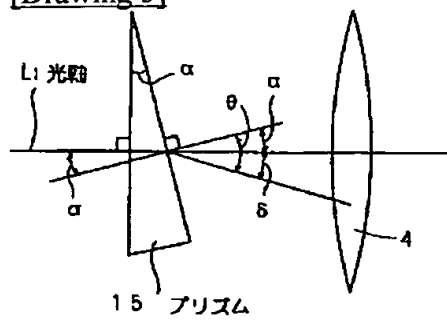
[Drawing 1]



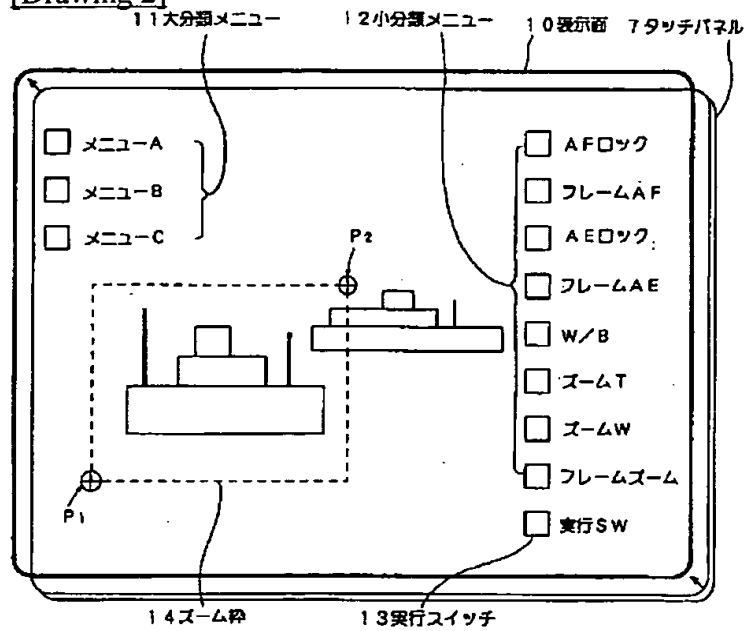
[Drawing 4]



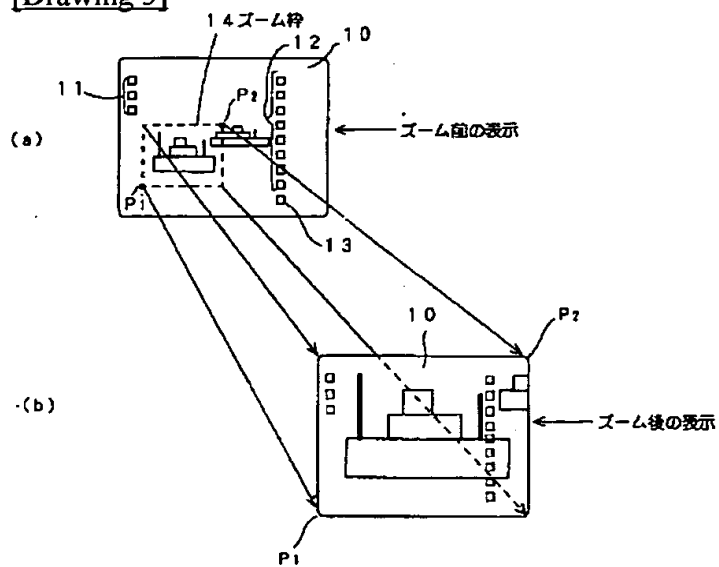
[Drawing 5]



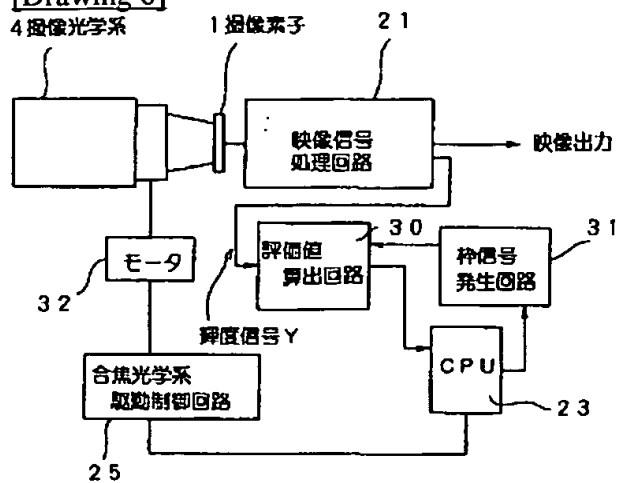
5 [Drawing 2]



[Drawing 3]



[Drawing 6]



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[Translation done.]